No. 200300214

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Paragon Seed, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSE , OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSES, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

LETTUCE

'Home Run'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this sixth day of September, in the year two thousand and six.

Attest:

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Secretary of Agriculture

REPRODUCE LOCALLY. *Include form number and date on all reproductions*

Form Approved - OMB No. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions and information collection burden statement on reverse)

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF OWNER
Paragon Seed, Inc.

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME
Exp. 1511

3. VARIETY NAME
Home Run

4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP Code, and Country)*
507 Abbott Street
Salinas, California 93901

5. TELEPHONE *(include area code)*
831-753-2100

6. FAX *(include area code)*
831-753-1470

FOR OFFICIAL USE ONLY

PVPO NUMBER
200300214

FILING DATE
Apr 14, 2003

7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION *(corporation, partnership, association, etc.)*
Corporation

8. IF INCORPORATED, GIVE STATE OF INCORPORATION
California

9. DATE OF INCORPORATION
March 7, 1994

10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION. *(First person listed will receive all papers)*
Victor Heintzberger President
P. O. Box 1906
Salinas, California 93902-1906

FEES RECEIVED

FILING AND EXAMINATION FEES:
1. $2705.00
$ 2. 947.00
1. 4/14/2003
DATE 2. 4/28/2003

CERTIFICATION FEE:
$ 768
DATE 5/10/06

11. TELEPHONE *(Include area code)*
831-753-2100

12. FAX *(Include area code)*
831-753-1470

13. E-MAIL
lettuceseed@aol.com

14. CROP KIND *(Common Name)*
Lettuce

15. GENUS AND SPECIES NAME OF CROP
Lactuca sativa L.

16. FAMILY NAME *(Botanical)*
Compositae

17. IS THE VARIETY A FIRST GENERATION HYBRID?
☐ YES ☒ NO

18. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse)

a. ☒ Exhibit A. Origin and Breeding History of the Variety
b. ☒ Exhibit B. Statement of Distinctness
c. ☒ Exhibit C. Objective Description of Variety
d. ☐ Exhibit D. Additional Description of the Variety *(Optional)*
e. ☒ Exhibit E. Statement of the Basis of the Owner's Ownership
f. ☒ Voucher Sample *(2,500 viable untreated seeds or, for tuber propagated varieties, verification that tissue culture will be deposited and maintained in an approved public repository)*
g. ☒ Filing and Examination Fee ($2,705), made payable to "Treasurer of the United States" *(Mail to the Plant Variety Protection Office)*

19. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE SOLD AS A CLASS OF CERTIFIED SEED? *See Section 83(a) of the Plant Variety Protection Act)*
☐ YES *(If "yes", answer items 20 and 21 below)* ☒ NO *(If "no", go to item 22)*

20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES? ☐ YES ☒ NO
IF YES, WHICH CLASSES? ☐ FOUNDATION ☐ REGISTERED ☐ CERTIFIED

21. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? ☐ YES ☒ NO
IF YES, SPECIFY THE NUMBER 1,2,3, *etc.* ☐ FOUNDATION ☐ REGISTERED ☐ CERTIFIED
(If additional explanation is necessary, please use the space indicated on the reverse.)

22. HAS THE VARIETY (INCLUDING ANY HARVESTED MATERIAL) OR A HYBRID PRODUCED FROM THIS VARIETY BEEN SOLD, DISPOSED OF, TRANSFERRED, OR USED IN THE U. S. OR OTHER COUNTRIES?
☒ YES ☐ NO
IF YES, YOU MUST PROVIDE THE DATE OF FIRST SALE, DISPOSITION, TRANSFER, OR USE FOR EACH COUNTRY AND THE CIRCUMSTANCES. *(Please use space indicated on reverse.)*

23. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT *(PLANT BREEDER'S RIGHT OR PATENT)*?
☒ YES ☐ NO
IF YES, PLEASE GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. *(Please use space indicated on reverse.)*

24. The owners declare that a viable sample of basic seed of the variety will be furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate.

The undersigned owner(s) is(are) the owner of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Owner(s) is(are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF OWNER		SIGNATURE OF OWNER	
NAME *(Please print or type)* Victor Heintzberger		NAME *(Please print or type)*	
CAPACITY OR TITLE President	DATE March 31, 2003	CAPACITY OR TITLE	DATE

Paragon Seed, Inc.

Iceberg Lettuce Variety **HOME RUN**

Experimental Designation **EXP 1511**

RAD 4/27/06

22 ~~23~~. Date of first sale : April 16, 2002

Salinas, California U.S.A.

23 ~~24~~. Parental Lines : **Hallmark W**
Paragon Seed, Inc.
PVP # 99000222

9602
University of California, Davis
& The United States Department of
Agriculture/ARS Salinas, California

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Exhibit A

Breeding History 'Home Run'

Home Run is the result of a hand pollinated cross made by Paragon Seed, Inc. personnel in the San Joaquin Valley of California in 1997.
The female (receptor) parent was the breeding line 'Px 37 ws', which became the lettuce variety Hallmark W (PVP # 9900222). 'Px 37 ws' was selected for its excellent heading ability, uniformity of type, tipburn resistance and corky root resistance (cor gene).
Seed color of 'Px 37 ws' is white (silver).

The male (pollen parent) selected for this cross was the breeding line '9602'. '9602' was developed and released in 1996 by Dr. Richard Michelmore and Oswaldo Ochoa at the University of California at Davis in collaboration with Dr. Edward J. Ryder at the USDA/ARS in Salinas, California. At the time of release, '9602' contained the designated downy mildew resistance factor R32 from Lactuca saligna LJ-81632 that conferred resistance effective against all California isolates tested to date. Seed color of '9602' is black.

In July, 1997, a hand pollinated cross was made between 'Px 37 w/s' and '9602'.
The cross was designated '3796'. F1 seed was harvested in August of 1997. Seeds of the cross were germinated in petrie dishes on November 12, 1997 and transferred to five-gallon pots for the purpose of seed production. Four plants survived winter greenhouse production and seed was harvested in April, 1998. F2 seed was again germinated in petrie dishes and transferred to transplant trays at the seedling stage. In early May, 1998, as plants were in the first true leaf stages, cotyledons were sprayed with a suspension of field harvested downy mildew spores and screened for downy mildew resistance. Plants were grown in a germination chamber at a constant 20 degrees with sixteen hours of light and eight hours of darkness. Plants were screened twice, once at ten days and again at fourteen days post inoculation.

Fourteen seedlings were selected from each of four lines and screened as follows:

Line	Resistant	Susceptible	
3796-1	9	4	$X^{2=}$ 3:1 segregation ratio
3796-2	14	0	
3796-3	11	3	$X^{2=}$ 3:1 segregation ratio
3796-4	13	1	

Data on crosses 3796-1 and 3796-3 indicate that a single dominant allele confers mildew resistance in 9602. However, 3796-2 and 3796-4 indicate a level of variability exists in '9602' for mildew resistance as indicated in the notice of release by Dr. Michelmore. 3

Exhibit A

Breeding History

After screening, the downy mildew susceptible plants were removed and destroyed. Resistant plants were transferred to Corcoran, California, transplanted, and grown to seed maturity. Seed was harvested in August, 1998 as follows:

F_2 to F_3	3796-1- 1	bs
	3796-1- 2	bs
	3796-1- 3	bs
	3796-1- 4	ws
	3796-1- 5	bs
	3796-1- 6	bs
	3796-1- 7	bs
	3796-1- 8	bs
	3796-2- 1	bs
	3796-2- 2	bs
	3796-2 3	bs
	3796-2- 4	bs
	3796-2- 5	bs
	3796-3- 1	bs
	3796-3- 2	bs
	3796-3- 3	bs
	3796-3- 4	bs
	3796-3- 5	bs
	3796-3- 6	bs
	3796-3- 7	bs
	3796-3- 8	bs
	3796-3- 9	ws
	3796-3- 10	ws
	3796-4- 1	bs
	3796-4- 2	bs
	3796-4- 3	bs
	3796-4- 4	ws

In spring, summer, and fall trials in the Salinas Valley during the 1999 production season the highest scoring line was 3796-1-5. The line appeared to have Corky Root Resistance, was not susceptible to mildew in field trials whereas mildew susceptible control varieties exhibited downy mildew. Selections of the 3796-1-5 lines were made during concurrent seed production near Corcoran, California. In August of 1999, eleven single plant selections were harvested as follows:

3796-1-5- {1,2,3,4,5,6,7,8,9,10,11} (Seed color of all selections white seed)

Exhibit A

Breeding History

In the summer of 2000, the decision was made to dig plants from two trials in the Salinas Valley where conditions were optimal for evaluation of lines for corky root resistance and downy mildew resistance. From these trials plants exhibiting desirable heading, slow bolting, dark green color and resistance to field mildew and corky root were dug and transplanted near Corcoran, California for seed production. Seed was harvested from five plants as follows:

Breeding Line	seed color
3796-1-5-11-J1	ws
3796-1-5-11-J2	ws
3796-1-5-11-J3	ws
3796-1-5-11-J4	ws
3796-1-5-11-J5	ws

Trials of the five selections were planted near King City, California in the spring, summer, and fall of 2001. Preliminary results of trials were promising, and a composite of 3796-1-5-11-J1 and 3796-1-5-11-J2 was used as stock seed to produce an experimental crop of 1511W near Corcoran, California. (Note: a small increase was also made with black seeded sister lines designated 1511B. This line was trialed and dropped in favor of the 1511W line.) The seed of 1511W was harvested in August of 2001, and growouts conducted in Yuma, Arizona in December of 2001. Growout evaluations were very promising for uniformity to type, bolt tolerance, and tipburn resistance. No corky root or downy mildew was noted in the desert trials. Trials were also conducted in the Salinas Valley of California with this seed and results were very favorable for type, mildew resistance, bolt tolerance, and corky root resistance as compared to Silverado, Durango, and Sniper.

On April 16, 2002 the name Home Run was reserved with the United States Department of Agriculture.

Home Run was developed by a hand pollinated cross followed by four generations of single seed descent and three generations of mass selection.

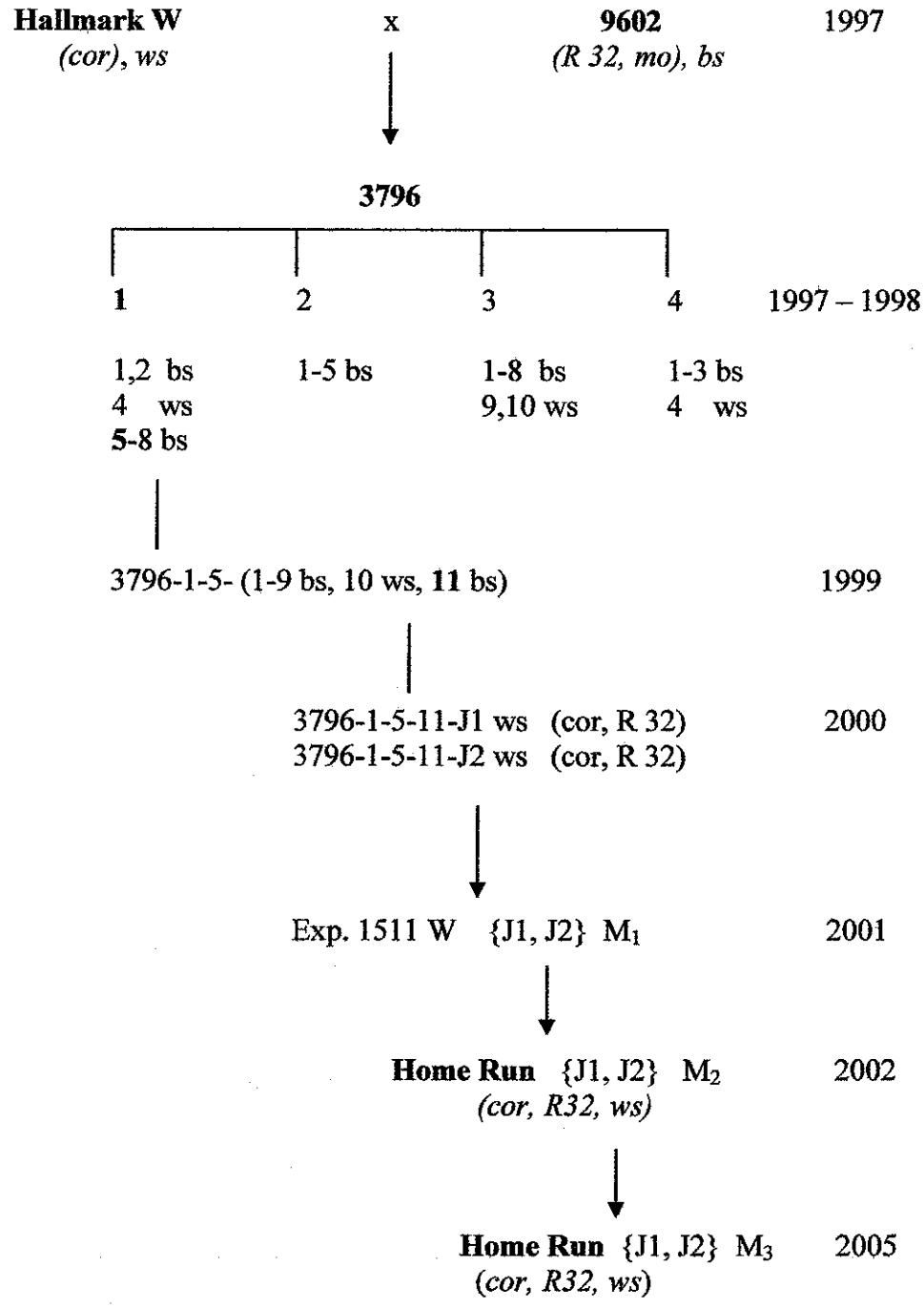
Home Run has been observed for three generations of reproduction and during the seed increase period and is stable and uniform. No variants were observed. Home Run is Distinct, Uniform, and Stable for all traits as described in Exhibit C of this application.

Home Run is resistant to Lettuce Corky Root. Resistance to California strain CA1 is imparted by the (cor) gene.

Home Run is resistant to lettuce downy mildew (Bremia lactucae) California pathotypes I, IIA, IIB, III, IV, V AND VI.

Exhibit A

Breeding History 'Home Run'



Lettuce Application No. 200300214 'Home Run'

Notes on R 32 and Dm 18 genes for Downy Mildew Resistance.

At the time the cross were made in 1997, there was confidence that the resistance factor R32 from U.C. Davis would confer resistance to downy mildew not available in resistant varieties with Dm 18. As we worked our way into the selection and disease screening process, it became evident that the R32 factor presented inconsistencies. Samples of mildew were sent to U.C. Davis for characterization with results that brought to attention that isolates of downy mildew that overcame Dm 18 also overcame lines that were released carrying resistance R32. Also, markers characteristic of lines carrying Dm 18 were also present in lines carrying R32. Multiple isolates have a parallel pattern of reactions on lines carrying Dm 18 and R 32 although reactions on Dm 18 may differ in their reaction and there may be differences in intensity of sporulation. The conclusion from U. C. Davis is that Dm 18 and R 32 seem to be functionally identical. This is surprising as the two resistances were apparently derived from different species; Dm 18 was derived from L. serriola and R 32 from L. saligna. This appears to be a case of independent introgression of the same resistance specificity multiple times.

Table One is from the Annual Report of the California Lettuce Research Board, April 1, 1999 through March 31, 2000.

Table 1. Virulence phenotypes of isolates used to characterize *Dm18* and R32.

		(CAIIa)	(CAIIb)		Isolate of *B. lactucae*				
		C83P24	C91D36	C93D14	C97O592	C98648ED	C99O706	C98O696	C99O776
Cultivar / Line	*Dm*/ R factor	1,4,11, 15,16,18	4,15,18	15	4,16	4	18	(18)	(0)[a]
					Avirulence phenotype				
Mariska[b]	18	-n	-	-n	*	*	-	-n	*
El Dorado	18	-	-	*	*	*	-	*	*
Colorado	18	-	-	*	*	+	-	-	*
UC9602	R32	-	-	*	*	*	-	*	*
Discovery	R37	-	-	-	-	-	-	-	-
Cobham Green	R0	+	+	+	+	+	+	+	+

+ = profuse sporulation, susceptible reaction. - = no sporulation, resistant reaction. n = necrosis.
* = some sporulation, often delayed and associated with necrosis.
[a] This isolate sporulates as profusely as any California isolate on lines carrying *Dm18*. However, sporulation on *Dm18* carry lines is never as profuse as on Cobham Green.
[b] Mariska may have additional genes.

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Exhibit B

Statement of Distinctness Home Run

Home Run is a medium framed, medium headed crisphead type lettuce best adapted for late spring, summer and early fall harvest in the coastal areas of California. Under normal growing conditions, Home Run produces round, well shaped heads suitable for wrap, naked pack, or processing. The textural quality of the head is very good, with excellent creamy yellow internal color. Under warmer than normal growing conditions, the core height may be slightly elongated. Under cooler than normal growing conditions, head size may be small.

Home Run is unique in its combined resistance of the Corky Root (cor) gene (Hallmark W) and the Lettuce Downy Mildew (R32/Dm18 gene) from the UC/USDA germplasm release '9602'. The (cor) gene imparts Corky Root Resistance to *California strain CA1.*
The R32/Dm18 gene resistance factor was derived from the breeding line '9602'; however, '9602' is not commercially acceptable due to susceptibility to tipburn, bolting, and heading variability. The line was released by the UC/USDA in 1996 so that breeders could introgress novel resistance genes into new varieties in an effort to help growers genetically control Lettuce Downy Mildew and reduce the use of chemicals. Home Run is resistant to lettuce downy mildew (Bremia lactucae) California pathotypes I, IIA, IIB, III, IV, V, and VI.

Home Run most closely resembles the variety Grand Slam, however, Home Run seed color is white (silver), whereas the seed color of Grand Slam is black. Leaf color of Home Run is 144B whereas the leaf color of Grand Slam is 144A based on color comparisons using the Royal Horticultural Colour Chart in two or more locations over a two year period.

To the knowledge of this breeder, the only other somewhat similar coastal crisphead lettuce varieties with the (cor, Dm 18) genes are Durango and Telluride (Coastal Seed, Inc.). Downy mildew resistance of these varieties was **not** derived from UC '9602'.

Durango (Coastal Seeds, Inc,)

Seed color of Durango is tan. Seed color of Home Run is white (silver).
Leaf color of Durango is 143A, whereas the leaf color of Home Run is 144B.

Telluride (Coastal Seeds, Inc.)

Seed of Telluride is tan. Seed color of Home Run is white (silver).
Leaf color of Telluride is 143B, whereas the leaf color of Home Run is 144B.

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE DIVISION

EXHIBIT C

OBJECTIVE DESCRIPTION OF VARIETY
LETTUCE *Lactuca sativa*

NAME OF APPLICANT (S)
Paragon Seed, Inc.

ADDRESS (Street and No. or R.F.D. No., City, State, and ZIP Code)
P. O. Box 1906
Salinas, California 93901

FOR OFFICIAL USE ONLY
PVPO NUMBER 20030014
VARIETY NAME Home Run
EXPERIMENTAL DESIGNATION Exp. 1511

Place numbers in the boxes for the characters which best describe this variety. Measured data should be the mean of an appropriate number (at least 10) of well spaced plants. Royal Horticultural Society or any recognized color standard may be used to determine plant colors.

The location of the test area is: Salinas, California

Color System Used: Royal Horticultural Society

1. PLANT TYPE: *(See list of suggested check varieties page 4.)*

[0 6]

01=Cutting/Leaf
02=Butterhead
03=Bibb
04=Cos or Romaine
05=Great Lakes Group
06=Vanguard Group
07=Imperial Group
08=Eastern (Ithaca) Group
09=Stem
10=Latin
11=OTHER

2. SEED:

COLOR: [1] 1=White (Silver Gray) 2=Black (Gray Brown) 3=Brown (Amber)

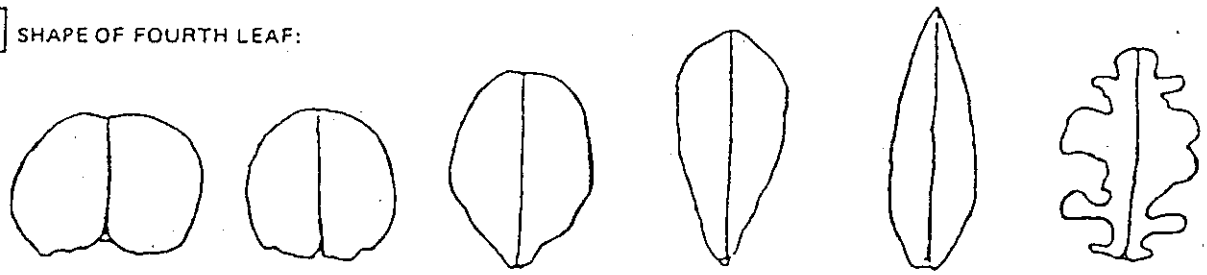
LIGHT DORMANCY: [2] 1=Light Required 2=Light Not Required

HEAT DORMANCY: [1] 1=Susceptible 2=Not Susceptible

3. COTYLEDON TO FOURTH LEAF STAGE: NOTE: Provide a color photograph or photocopy of the fourth leaf from 20 day old seedling grown under optimal conditions.

[2] SHAPE OF COTYLEDONS: 1=Broad 2=Intermediate 3=Spatulate

[3] SHAPE OF FOURTH LEAF:



1 2 3 4 5 6

[1 3] LENGTH/WIDTH INDEX OF FOURTH LEAF: L/W x 10

[1] APICAL MARGIN: [4] BASAL MARGIN: 1=Entire 2=Crenate/Gnawed 3=Finely Dentate 4=Moderately Dentate 5=Coarsely Dentate 6=Incised 7=Lobed 8=OTHER *(specify)*

[2] UNDULATION: 1=Flat 2=Slight 3=Medium 4=Marked

[3] GREEN COLOR: 1=Yellow Green 2=Light Green 3=Medium Green 4=Dark Green 5=Blue Green 6=Silver Green 7=Gray Green

ANTHOCYANIN:

[1] DISTRIBUTION: 1=Absent 2=Margin Only 3=Spotted 4=Throughout 5=OTHER *(specify)*

[0] CONCENTRATION: 1=Light 2=Moderate 3=Intense

[1] ROLLING: 1=Absent 2=Present

[2] CUPPING: 1=Uncupped 2=Slight 3=Markedly

[1] REFLEXING: 1=None 2=Apical Margin 3=Lateral Margins

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4. MATURE LEAVES *(observe harvest-mature outer leaves)*:

NOTE: Provide color photo of harvest-mature leaves which accurately shows color and margin characteristics.

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MARGIN:

2	INCISION DEPTH: *(deepest penetration of the margin)*	1=Absent/Shallow (Dark Green Boston)	2=Moderate (Vanguard)	3=Deep (Great Lakes 659)
4	INDENTATION: *(finest divisions of the margin)*	1=Entire (Dark Green Boston) 2=Shallowly Dentate (Great Lakes 65)	3=Deeply Dentate (Great Lakes 659) 4=Crenate (Vanguard)	5=OTHER *(specify)*
2	UNDULATION OF THE APICAL MARGIN:	1=Absent/Slight (Dark Green Boston)	2=Moderate (Vanguard)	3=Strong (Great Lakes 659)
3	GREEN COLOR:	1=Very Light Green (Bibb) 2=Light Green (Minetto)	3=Medium Green (Great Lakes) 4=Dark Green (Vanguard)	5=Very Dark Green 6=OTHER

ANTHOCYANIN *(grown at or below 10 C)*:

1	DISTRIBUTION:	1=Absent 2=Margin Only (Big Boston)	3=Spotted (Calif. Cream Butter) 4=Throughout (Prize Head)	5=OTHER *(specify)*
0	CONCENTRATION:	1=Light (Iceberg)	2=Moderate (Prize Head)	3=Intense (Ruby)
2	SIZE:	1=Small	2=Medium	3=Large
2	GLOSSINESS:	1=Dull (Vanguard)	2=Moderate (Salinas)	3=Glossy (Great Lakes)
1	BLISTERING:	1=Absent/Slight (Salinas)	2=Moderate (Vanguard)	3=Strong (Prize Head)
3	LEAF THICKNESS:	1=Thin	2=Intermediate	3=Thick
1	TRICHOMES:	1=Absent (smooth)	2=Present (spiny)	

5. PLANT *(at market stage. Choose a comparison variety appropriate for this type.)*:

SPREAD OF FRAME LEAVES:
37 cm This Variety — 40 cm Hallmark W *(specify comparison variety)*

HEAD DIAMETER *(market trimmed with single cap leaf)*:
16 cm This Variety — 18 cm Hallmark W *(specify comparison variety)*

3	HEAD SHAPE:	1=Flattened 2=Slightly Flattened	3=Spherical 4=Elongate	5=Non-Heading 6=OTHER
2	HEAD SIZE CLASS:	1=Small	2=Medium	3=Large

24 HEAD COUNT PER CARTON

HEAD WEIGHT:
883 g This Variety — 824 g Hallmark W *(specify comparison variety)*

3	HEAD FIRMNESS:	1=Loose 2=Moderate	3=Firm 4=Very Firm

6. BUTT *(bottom of market-trimmed head)*:

2	SHAPE:	1=Slightly Concave	2=Flat	3=Rounded
1	MIDRIB:	1=Flattened (Salinas)	2=Moderately Raised	3=Prominently Raised (Great Lakes 659)

7. CORE *(stem of market-trimmed head)*:

40 mm Diameter at base of head

40 Ratio of head diameter/core diameter

40 Core height from base of head to apex:
mm This Variety — 35 mm Hallmark W *(specify comparison variety)*

8. BOLTING *(Give First Water Date 04/15/02)*; NOTE: First Water Date is the date seed first receives adequate moisture to germinate. This can and often does equal the planting date.

Number of days from First Water Date to seed stalk emergence *(summer conditions)*:
65 This Variety — 63 Grand Slam *(specify comparison variety)*

2	BOLTING CLASS:	1=Very Slow 2=Slow	3=Medium 4=Rapid	5=Very Rapid

Height of mature seed stalk:
90 cm This Variety — 92 cm Grand Slam *(specify comparison variety)*

20030214

Spread of Bolter Plant *(at widest point)*:

[4][3] cm This Variety [4][5] cm Grand Slam *(specify comparison variety)*

[1] BOLTER LEAVES: 1=Straight 2=Curved

[2] MARGIN: 1=Entire 2=Dentate

[1] COLOR: 1=Light Green 2=Medium Green 3=Dark Green

BOLTER HABIT:

[2] TERMINAL INFLORESCENCE: 1=Absent 2=Present

[1] LATERAL SHOOTS: *(above head)* 1=Absent 2=Present

[1] BASAL SIDE SHOOTS: 1=Absent 2=Present

9. MATURITY *(earliness of harvest-mature head formation)*:

NOTE: Complete this section for at least one season.

SEASON	Applic. 1/ #of days	Check 1/ #of days	CHECK VARIETY 2/
Spring	88	90	Hallmark W
Summer	64	65	Grand Slam
Fall	76	77	Venus
Winter	94	96	Valley Queen

Give planting date(s), and location(s):

		plant	harvest
Spring	Greenfield, Ca.	02-15-02	05-15-02
Summer	Salinas, Ca.	05-30-02	08-02-02
Fall	King City, Ca.	08-06-02	10-22-02
Winter	Wellton, Arizona	10-01-02	01-05-03

1/ First water date to harvest. 2/ Fill in check variety name on the appropriate line.

10. ADAPTATION:

PRIMARY REGIONS OF ADAPTION *(tested and proven adapted)*: (0=Not tested 1=Not Adapted 2=Adapted)

[2] Southwest *(Calif., Ariz. desert)* [2] West Coast [0] Northeast

[0] Northcentral [0] Southeast [ ] OTHER _____

SEASON:

[2] Spring (area Salinas, Santa Maria Ca.) [2] Fall (area Salinas, Santa Maria, Ca.)

[2] Summer (area Salinas, Santa Maria Ca.) [0] Winter (area _____)

[0] GREENHOUSE: 0=Not tested 1=Not Adapted 2=Adapted

[1] SOIL TYPE: 1=Mineral 2=Organic 3=Both

11. DISEASES AND STRESS REACTIONS (0=Not tested; 1=Susceptible; 2=Intermediate; 3=Resistant; 4=Highly resistant; 5=Tolerant):

20030014

VIRUS

- [1] Big Vein
- [0] Lettuce Mosaic
- [0] Cucumber Mosaic
- [0] Broad Bean Wilt
- [0] Turnip Mosaic
- [0] Beet Western Yellows
- [0] Lett. Infectious Yellows
- [ ] Other Virus _____

FUNGAL/BACTERIAL

- [3] Corky Root Rot (Pythium Root Rot) California CA1
- [3] Downy Mildew (Races I,IIA,IIB,III,IV,V,VI
- [0] Powdery Mildew
- [1] Sclerotinia Rot
- [1] Bacterial Soft Rot (Pseudomonas spp. & others)
- [1] Botrytis (Gray Mold)
- [ ] OTHER _____

INSECTS

- [0] Cabbage Loopers
- [1] Root Aphids
- [1] Green Peach Aphid
- [ ] Other Insect _____

PHYSIOLOGICAL/STRESS

- [2] Tipburn
- [0] Heat
- [0] Drought
- [0] Cold
- [0] Salt
- [0] Brown Rib (Rib Discoloration, Rib Blight)
- [ ] OTHER _____

POST HARVEST

- [1] Pink Rib
- [1] Russet Spotting
- [0] Rusty Brown Discoloration
- [0] Internal Rib Necrosis (Blackheart, Gray Rib, Gray Streak)
- [0] Brown Stain

12. BIOCHEMICAL OR ELECTROPHORETIC MARKERS:

13. COMMENTS:

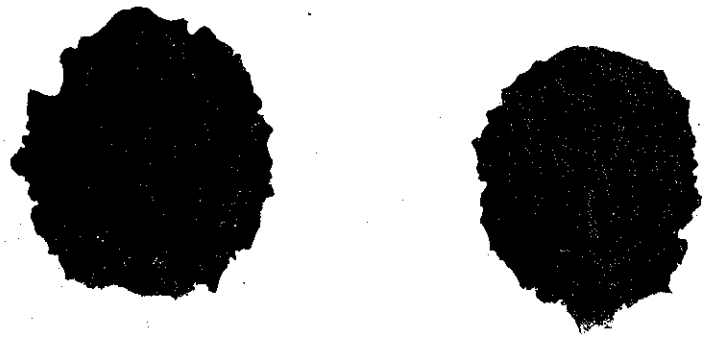
SUGGESTED CHECK VARIETIES

TYPE	CHECK VARIETY
1) CUTTING/LEAF	SALAD BOWL
2) BUTTERHEAD	DARK GREEN BOSTON
3) BIBB	BIBB
4) COS, OR ROMAINE	PARRIS ISLAND
5) GREAT LAKES GROUP	GREAT LAKES 659-700
6) VANGUARD GROUP	VANGUARD
7) IMPERIAL GROUP	VIVA
8) EASTERN GROUP	ITHACA
9) STEM	CELTUCE
10) LATIN	MATCHLESS

12

Paragon Seed, Inc.

Photocopy of Leaf Margin



Grand Slam Home Run

Photocopy of fourth leaf from 20 day old plant grown under optimum conditons

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STATEWIDE INTEGRATED PEST MANAGEMENT PROGRAM

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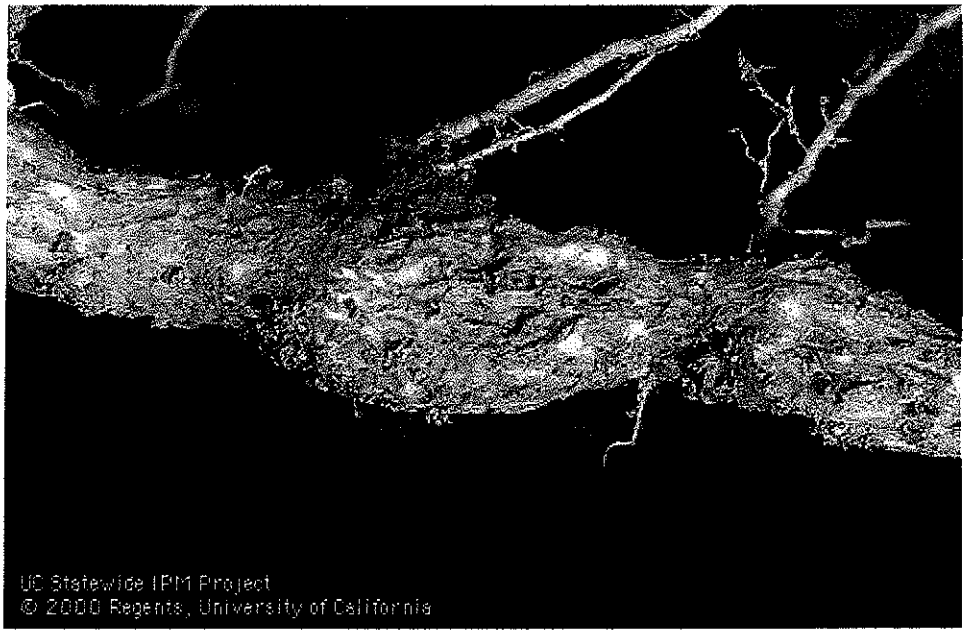

Corky root causes the surface of lettuce roots to become pitted.
Photo by Jack Kelly Clark.

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200300214

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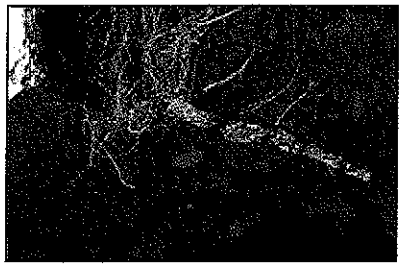
Lettuce
Corky Rot
Pathogen: *Rhizomonas suberifaciens*
(Reviewed 1/02, updated 1/02)



In this Guideline:

SYMPTOMS
Early symptoms of corky root are yellow bands on tap and lateral roots of lettuce seedlings. These yellow areas gradually expand, taking on a green brown color and developing cracks and rough areas on the surface of the root. As disease severity increases, the entire tap root may become brown, severely cracked, and nonfunctional; the feeder root system will also be reduced and damaged. At this point, roots are very brittle and easily break off when examined. Corky root may cause internal discoloration of the root. When the root is severely diseased, aboveground symptoms consist of wilting during warm temperatures, stunting of plants, and general poor and uneven growth. Corky root symptoms could be confused with ammonium toxicity, which causes a brick-red discoloration of the central portion of the root and wilting of lettuce foliage.

COMMENTS ON THE DISEASE
The corky root bacterium, *Rhizomonas suberifaciens,* is a soilborne pathogen that is prevalent in most coastal lettuce growing areas but may not be present in inland regions. Corky root affects both leaf and head lettuce varieties. Disease is typically more severe when soil temperatures are warmer. Corky root is worse in fields where lettuce is grown consecutively. High soil nitrate levels can increase disease severity.

MANAGEMENT
Rotate crops out of lettuce; do not grow lettuce consecutively. Avoid over fertilizing with nitrogen fertilizers. Some corky root resistant cultivars are now available. For corky root infected crops, growers may need to add additional fertilizer and water in order to bring the crop to maturity. High, well-draining beds may sometimes reduce corky root severity.

PUBLICATION
UC PEER REVIEWED
UC IPM Pest Management Guidelines: Lettuce
UC ANR Publication 3450
Diseases
S. T. Koike, UC Cooperative Extension, Monterey Co.
R. M. Davis, Plant Pathology, UC Davis

Top of page

IS

Paragon Seed, Inc. Shultz Ranch Salinas 07/98

9602 Hallmark W

Sharpshooter Silverado Hallmark W

Paragon Seed, Inc. **Salinas, California** **May 2002**

SILVERADO Coastal Seed Field Planting

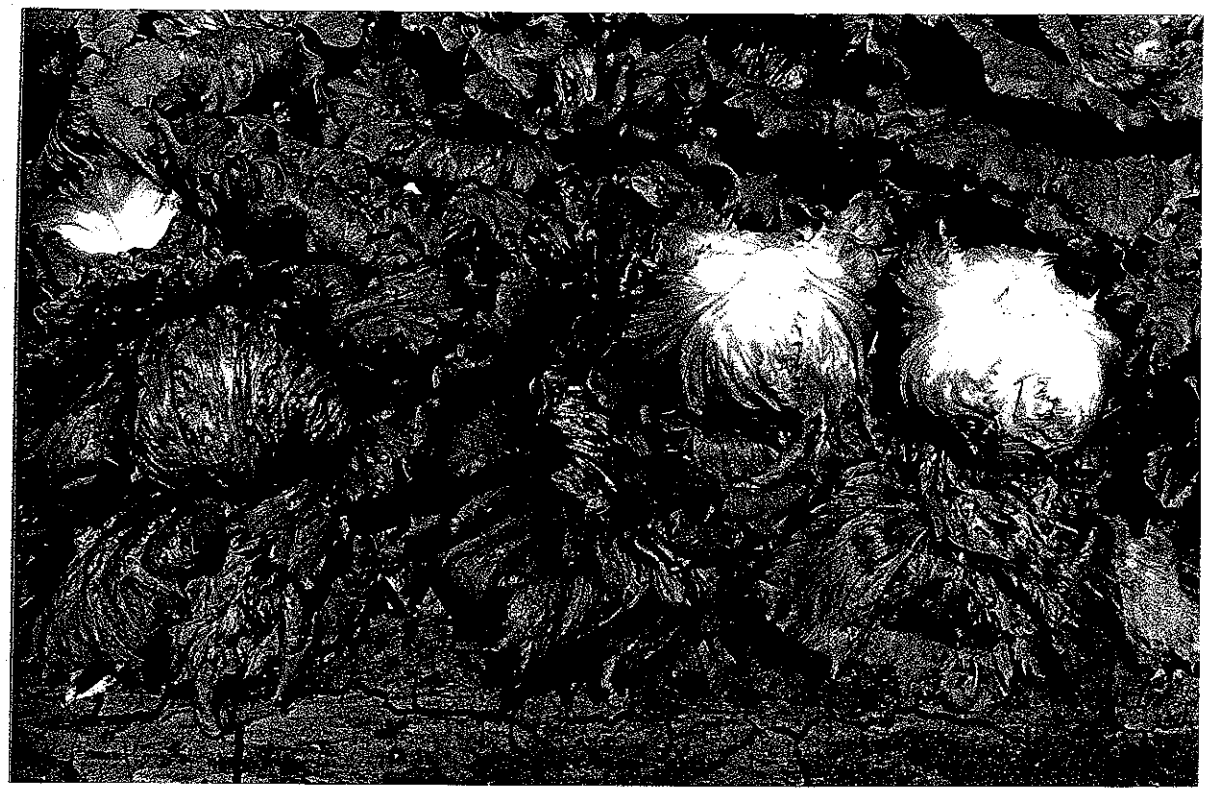
SILVERADO

Paragon Seed, Inc. **Salinas, California** **May 2002** Martella Ranch

Silverado Coastal Seeds Corky root rot on lettuce roots

Silverado lower two roots HOME RUN top two roots

HOME RUN Exp. 1511



HOME RUN Exp. 1511

Paragon Seed, Inc. **Salinas, California** **May 2002** Martella Ranch

Silverado Coastal Seeds Corky root rot on lettuce roots

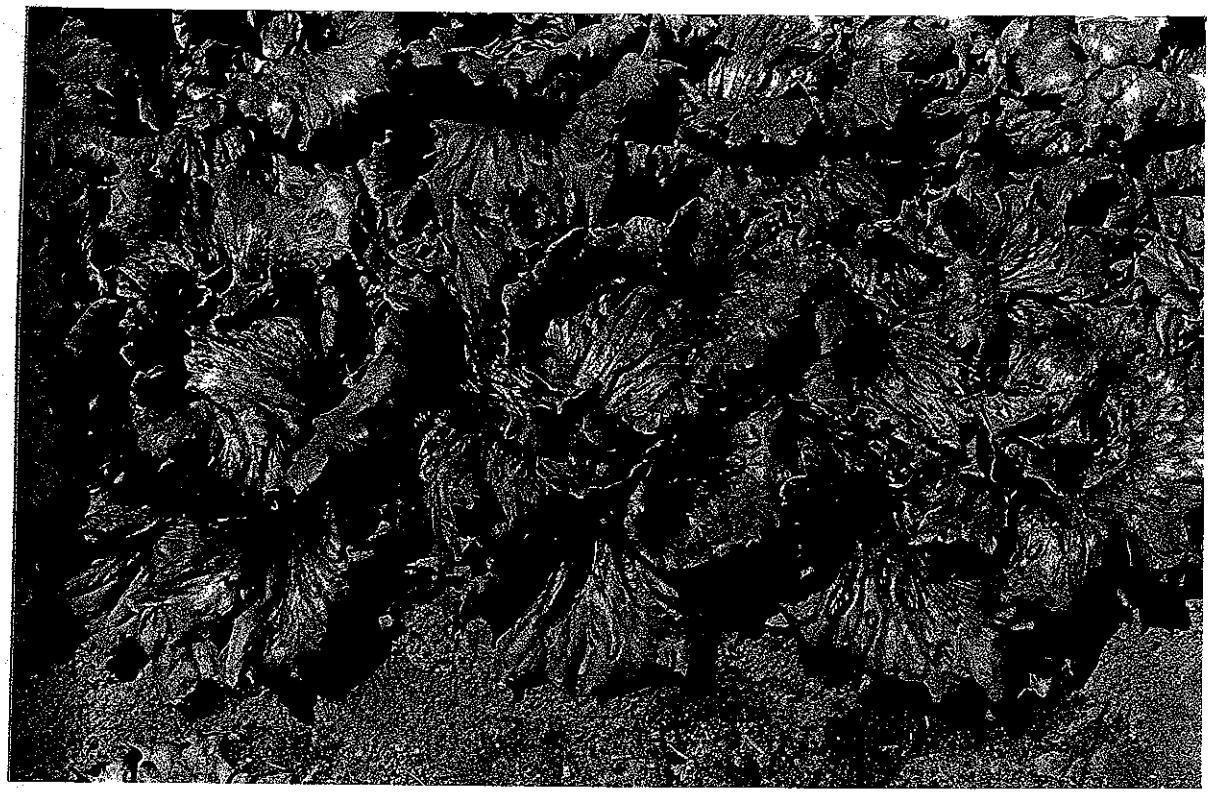
Silverado lower two roots HOME RUN top two roots

Paragon Seed, Inc. Salinas, California May 2002 Martella Ranch

Silverado lower two roots HOME RUN top two roots

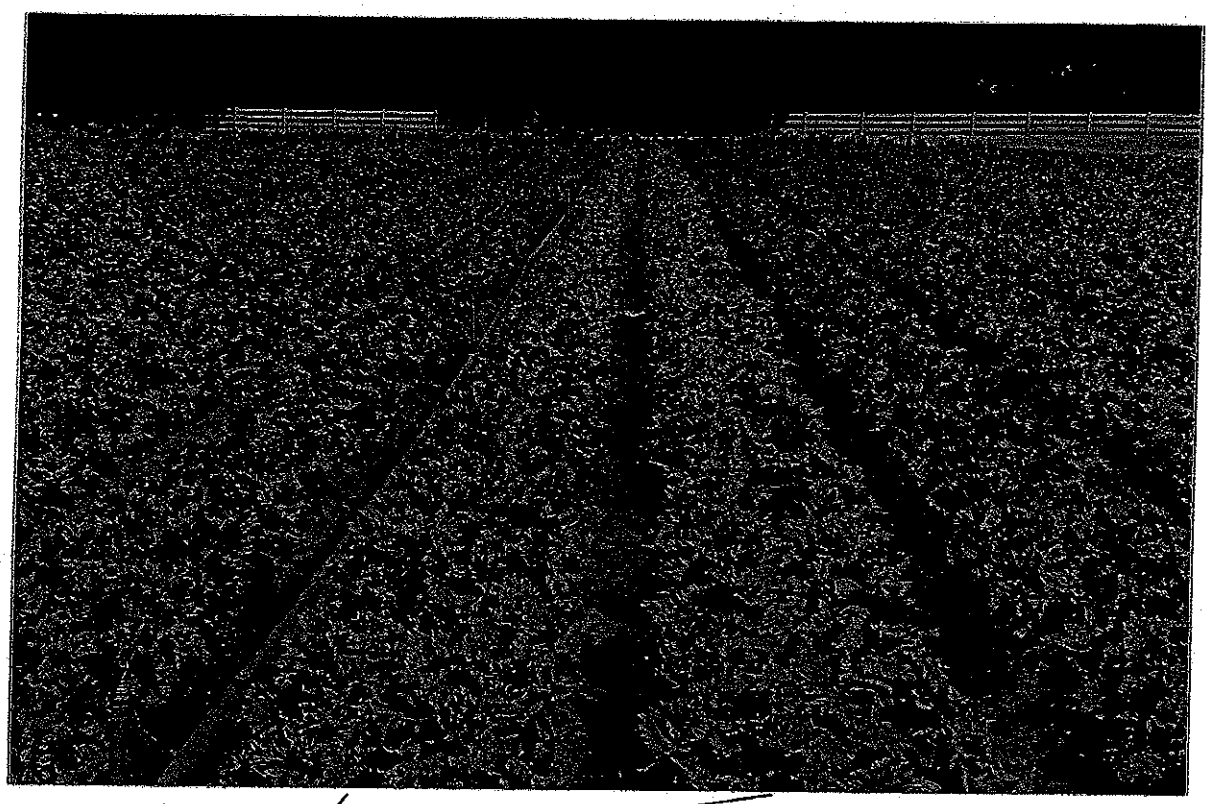
Paragon Seed, Inc. Salinas, California May 2002 Leonardini

HOME RUN Exp. 1511



DURANGO Coastal Seeds

Paragon Seed, Inc. Salinas, California May 2002 Leonardini



Field GRAND SLAM HOME RUN Field

Field Planting DURANGO

May 31, 2002 Buena Vista District Salinas Valley, California

Lettuce Downy Mildew Screening Procedures

Paragon Seed, Inc. 2005

BACKGROUND

Downy Mildew is caused by the fungus-like organism *Bremia lactucae.* Infection occurs when wind, seed, or soil-borne spores (oospores or sporangia) germinate on leaves in the presence of free moisture or relative humidity near saturation when temperatures are cool to moderate (40 to 86 degrees F). High and low temperatures extend the latent period and slow disease development, but extended periods of morning leaf wetness favor infection. The pathogen survives between lettuce crops in and on lettuce seeds, pathogenically on wild Lactuca ssp., and soil-borne oospores, but wind blown spores can also be important in disease development, especially in the Salinas Valley and Santa Maria Valley of California.

On mature lettuce leaves, downy mildew symptoms first appear as angular, variably sized light green or light yellow lesions, but later become yellow or necrotic. Lesions are often bounded by large veins. When temperatures are moderate and humidity is high, sporulation is evident on leaves, especially on the lower sides of leaves. Older lesions become brown and necrotic. Severe infections can kill seedlings, but adult plants are rarely killed. Early infections can also become systemic and cause a dark brown discoloration of vascular tissues. Low levels of infection can downgrade the crop, causing significant trimming losses at harvest, and promoting decay during post-harvest storage. High levels of downy mildew can cause an entire crop to be unmarketable.

Paragon Seed, Inc. relies heavily on downy mildew resistant Lactuca sativa introductions and information provided by the University of California at Davis. As new genetics are released and available, genes are introgressed into Paragon Seed, Inc. germplasm, and screens are conducted to identify susceptibility and/or resistance in new breeding lines. In the case of Downy Mildew Resistance Screening, backcross and single seed descent strategies are employed in early generation breeding.

PROCEDURES

The following procedures are followed to screen lettuce breeding lines for "field" downy mildew resistance.

Seed of breeding lines with potential downy mildew resistance genes are identified and organized in the laboratory.

Lettuce Downy Mildew Resistance Screening 2005

Standard plastic greenhouse flats of 128 cells (8 x 16) are filled with commercially available sterilized potting soil, and pre-moistened prior to seeding.

Once the tray has been staked as per a pre-determined map, two seeds of each breeding line are placed in each cell.

Trays are mist watered to runoff, covered, and placed in a germination chamber (20 degrees C., 8 hours light, 16 hours dark) until germination occurs.

Trays are then moved outdoors, and plants grown until the first true leaf has emerged.

Our "common" downy mildew screen utilizes a mixture of field harvested downy mildew spores from various growing areas and varieties. Infected leaves are collected from commercial production fields. The leaves are returned to the lab, washed using distilled water, and then loosely layered on moist paper towels in a sealed plastic bag. The sealed bag is then placed overnight in the dark in a refrigerated growth chamber (10 °C). Twenty four hours later, leaves are removed from the growth chamber and the fresh downy mildew spores are gently misted to runoff. The spores are collected, filtered and then ready for inoculation.

The spore solution is then sprayed onto the lettuce seedlings using a Badger micro air-brush sprayer using pressurized 1,1 diflouroethane propellant.

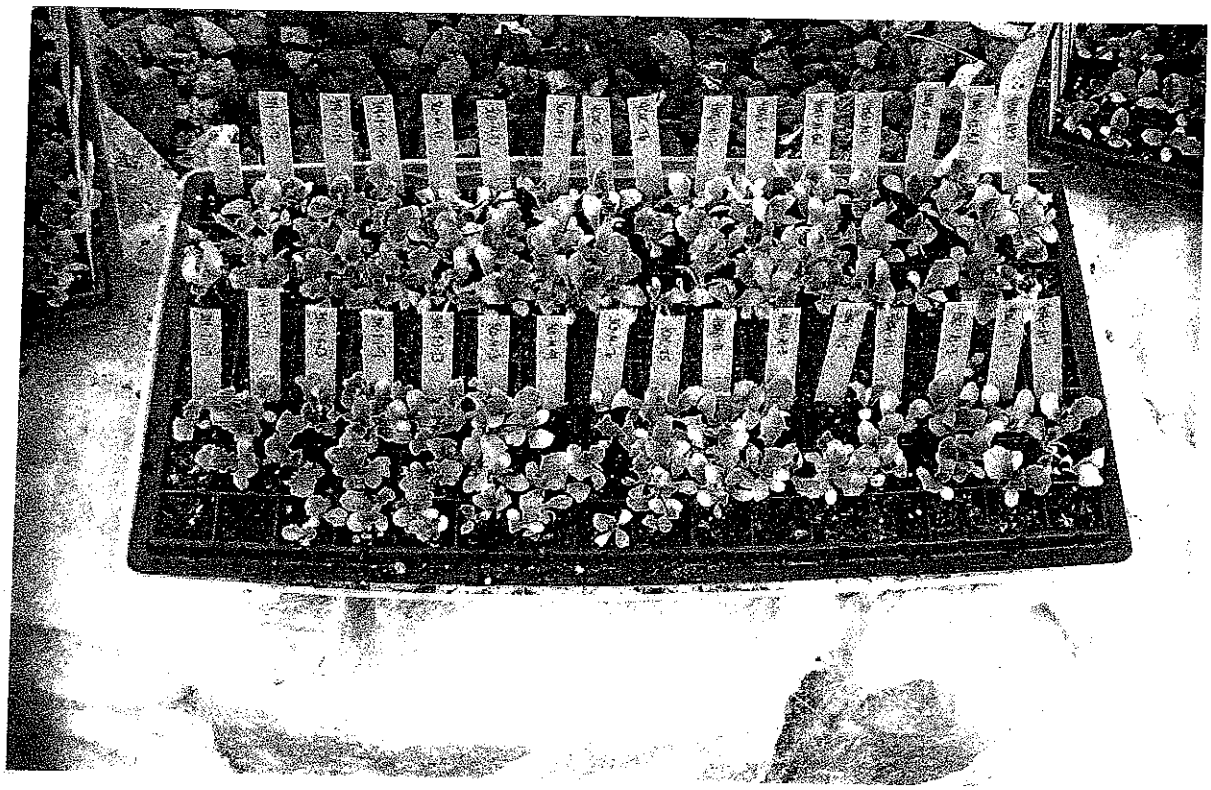
The trays are again placed into plastic bags and returned to the growth chamber for twenty four hours at 10 °C.

The following day the plants are removed from the growth chamber and grown outdoors for a period of eight to ten days.

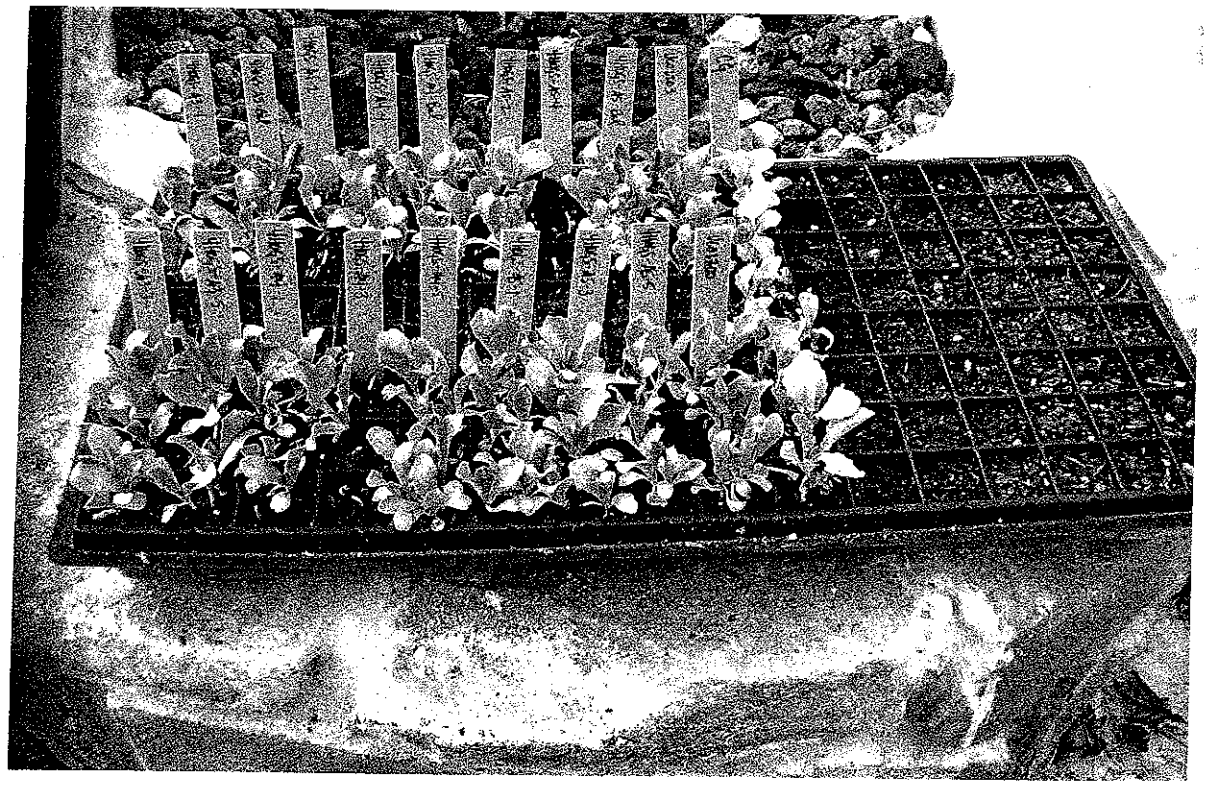
After a minimum of eight days, the plants are watered, placed into plastic bags, and returned to the growth chamber for twenty four hours in the dark at 10°C.

The plants are removed from the growth chamber after twenty four hours and are visually inspected for the presence of sporangiophores. Plants that show visible sporulation are removed and destroyed. Trays can be returned to the growth chamber for an additional dark cycle if necessary.

Resistant plants are noted and recorded and either transplanted to the greenhouse or seed field for seed increase or destroyed.



TRAYS OF LETTUCE SEEDLINGS POST INNOCULATIO



POST EVALUATION 14 DAYS

RESISTANT PLANTS REMAIN

RELEASE OF LETTUCE BREEDING LINES - DECEMBER 1996.

Four groups of advanced breeding lines of lettuce are available for use by plant scientists and breeders in public and private institutions. All lines were developed by Richard Michelmore and Oswaldo Ochoa at University of California, Davis in collaboration with Ed Ryder at USDA/ARS, Salinas. When this germplasm contributes to a new cultivar, appropriate recognition should be given as to its origin.

These lines have been developed to provide superior disease resistance in a Salinas horticultural type by backcrossing to either cv. Salinas or cv. Salinas 88. The pedigrees of these lines is attached; additional details to those given below can be found in the annual reports of California Iceberg Lettuce Research Program. These lines are close to horticultural types suitable for use in the coastal production areas of California. However, there is residual variation in most of these lines and further selections may be required to fix plant type. Trails and selections should be made to determine specific areas and seasons to which these lines are best adapted.

The first group of four lines has downy mildew resistance originating from a breeding line with cv. Kordaat in its pedigree and have downy mildew resistance due to *Dm1* and *Dm4* as well as *Dm8* from cv. Salinas (Fig. 1). This combination of genes currently protects against many but not all California isolates of downy mildew. These genes have been combined with corky root resistance from Greenlakes.

The second group of 16 related lines originated from a cross with *Lactuca serriola*, PIVT1309, and contain *Dm15* as well as *Dm8* from Salinas (Fig. 2). Again, these lines are resistant to many but not all California isolates of downy mildew. *Dm15* provides resistance to a different spectrum of isolates than the *Dm1* plus *Dm4* combination. (Note: it is difficult to combine *Dm1* with *Dm15* as they are in the same linkage group and therefore tend to be genetically mutually exclusive.) This resistance has also been combined with corky root resistance from Greenlakes.

One line originated from a resistant breeding line originating from the National Vegetable Research Station (now Horticulture Research International), Wellesborne, UK from an accession of *Lactuca saligna* that was resistant to all European downy mildew isolates tested. We have backcrossed this resistance into the Salinas type (Fig. 3). This resistance remains effective against all the California isolates that we have tested, although it will probably be overcome in time by changes in the pathogen. This resistance is currently designated resistance factor 32 (R32) until its genetics is more fully characterized, at which time it will be assigned a *Dm* gene number.

The fourth group of four lines have resistance to anthracnose from one of two sources (Fig. 4). The cv. Salad Bowl source provides resistance against most of the California isolates tested that resulted from the 1982/1983 epidemic. The *Lactuca saligna* source, UC83US1, provides resistance against all California isolates tested. As this disease has not been problematic recently we have not had more current isolates to test against.

Figure 3: Pedigree of lines carrying R32 and mo.

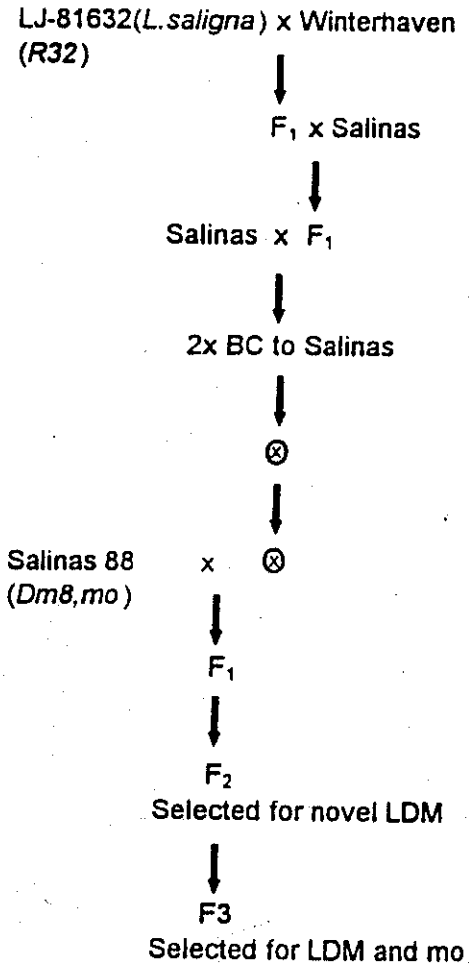


Figure 4: Pedigree of lines carrying anthracnose resistance from two different sources.

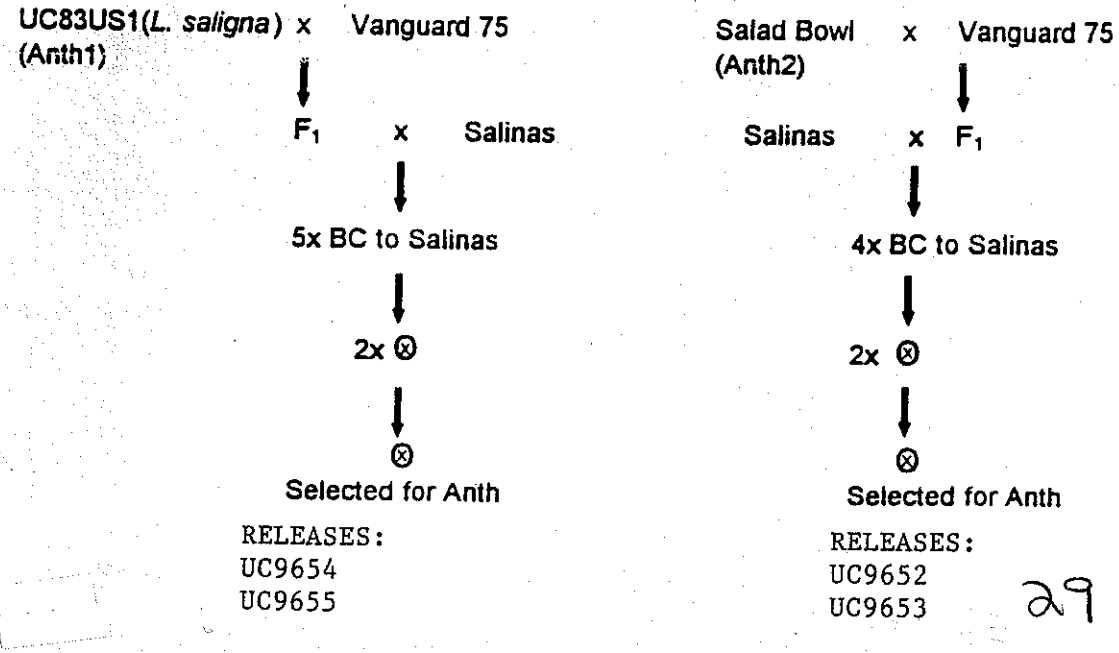
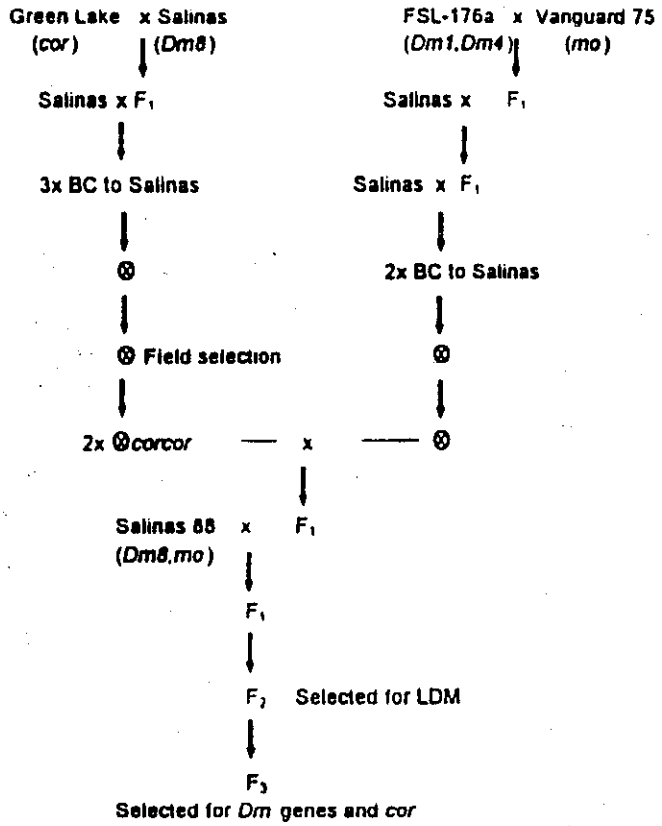
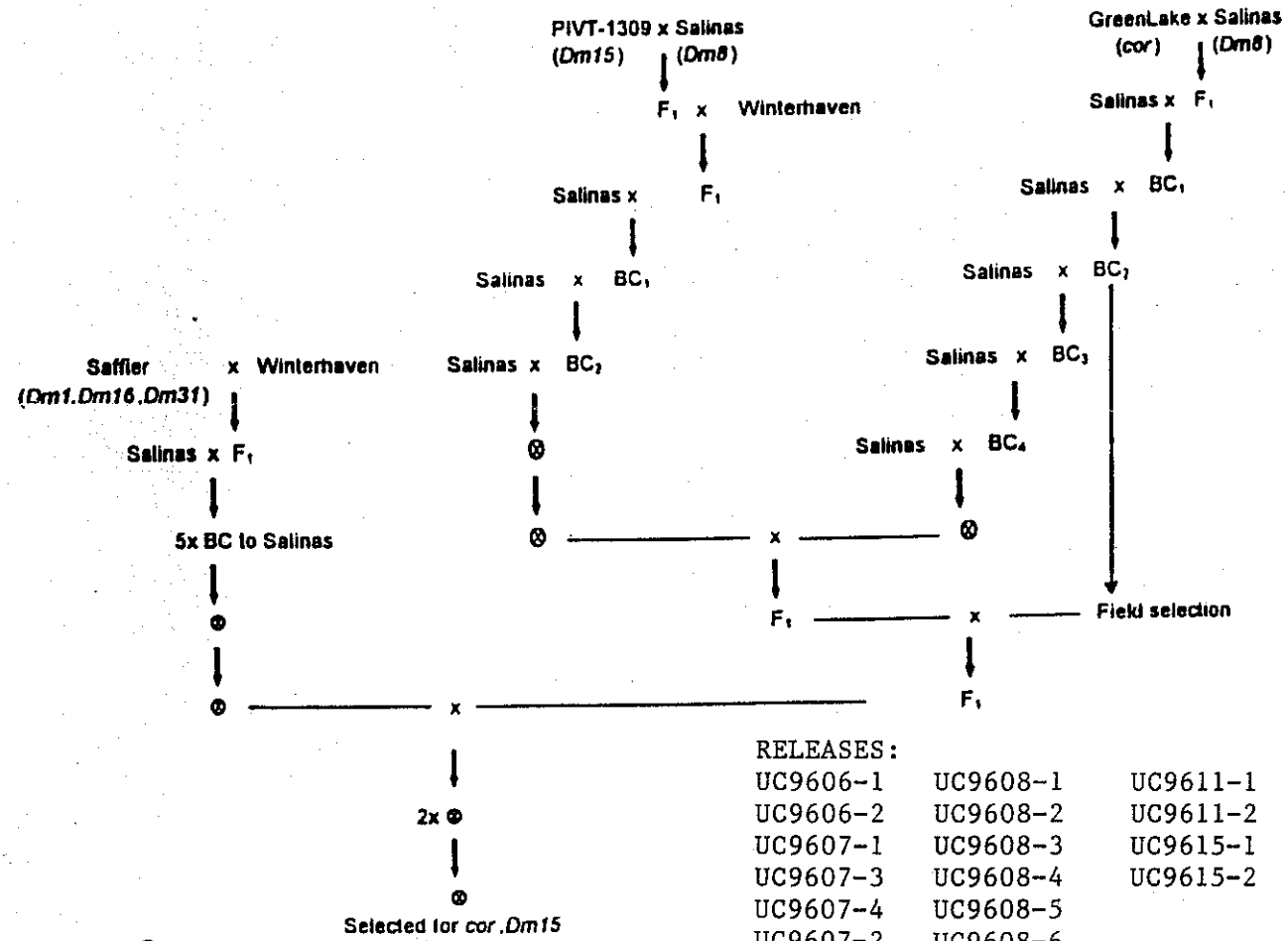


Figure 1: Pedigree of lines carrying *Dm1*, *Dm4*, *Dm8*, *mo* and *cor*



RELEASES:
UC9612
UC9614-1
UC9614-2
UC9620
UC9657
UC9659

Figure 2: Pedigree of lines carrying *Dm15* and *cor*.



RELEASES:

UC9606-1	UC9608-1	UC9611-1
UC9606-2	UC9608-2	UC9611-2
UC9607-1	UC9608-3	UC9615-1
UC9607-3	UC9608-4	UC9615-2
UC9607-4	UC9608-5	
UC9607-2	UC9608-6	

Table 3. Virulence phenotypes of isolates of *B. lactucae* currently being used to select for breeding lines resistant to downy mildew.

		(CAIIa) C83P24	(CAIIb) C91D36	C93D14	Isolate C97O592	C98648ED	C99O706	C98O696
Cultivar / Line	*Dm*/ R factor	1,4,11, 15,16,18	4,15,18	15	4,16	4	(18), A[a]	(18)
					Avirulence phenotype			
Lednicky	1	-	+	+	+	+	+	+
UCDM2	2	+	+	+	+	+	+	+n
Dandie	3	+	+	+	+	+	+	+n
R4/T57E	4	-	-	+	-	-	+/(-)	+n
Valmaine	5/8	+n	+	+n	+n	+	+	+n
Sabine	6	+	+	+	+	+	+	+n
LSE57/15	7	+n	+	+n	+	+	+	+n
UCDM10	10	+n	+	+n	+	+	+	+n
Capitan	11	-	+	-	+	+	+	+n
Hilde	12	+n	+	+n	+	+	+	+n
Empire	13	+n	+	+n	+	+	+	+n
UCDM14	14	+n	+	+	+	+	+	+n
PIVT1309	15	-n	-	-	+	+	+	+n
LSE18	16	-/(-)n	-n	+n	-/(-)n	+	+n	+n
LSE 12	17	-n	-	-	-	-	-	-
Mariska	18	-n	-	-n	-/(-)	(-)/-	-	-n
El Dorado	18	-	-	(-)/-	+/(-)	+/(-)	-	-/(-)n
UC9602	R32	-	-	-	(-)/-	-/(-)	-	-/(-)
Colorado	18sec?	-	-	(-)/-	+/(-)	(-)	-	-
Ninja	R36	-	-/(-)n	-	+/(-)	(-)	+/(-)/-	(-)/+/-
Discovery	R37	-	-	-	-	-	-	-
Argeles	R38	-/(-)	-	-/(-)	(-)/-	-/(-)	-/(-)	(-)/+
Amplus	2,4,?[a]	+/(-)	-	+	-	-	-	+
Cobham Green	none	+	+	+	+	+	+	+

+ = susceptible reaction. - = resistant reaction. n = necrosis. (-) = some delayed sporulation associated with necrosis.

[a] Reaction on Amplus is not consistent with *Dm* genes known to be present; there may be an additional gene in Amplus active against this isolate.

Corky Root: Crosses have been made to introduce corky root resistance (*cor*) into the green leaf, red leaf, and butterhead types. The *cor* gene is being introduced into these types from a corky root resistant crisphead breeding line (UC99G301). Backcrosses will be made this year. We have identified molecular markers (see separate report) that will allow the rapid identification of lines carrying *cor*. For the romaine type, 'Tall Guzman', a corky root resistant cultivar is being used as a recurrent parent, therefore introduction of *cor* from a non-romaine type is not necessary.

letstat

PARAGON SEED COMPANY

P.O. Box 1906 Salinas, Ca. 93902 831-753-2100

Grand Slam vs Home Run

Iwamoto-Moro Cojo — **Harvest date: June 10, 2002**

	Grand Slam Solidity	Home Run Solidity	Grand Slam Circum	Home Run Circum	Grand Slam Weight	Home Run Weight	Grand Slam Core Ht	Home Run Core Ht
Count	24	24	24	24	24	24	24	24
Sum	72.0	71.0	1,148.5	1,162.5	17,980.0	16,664.0	32.25	29.75
Mean	3.00	2.96	47.85	48.44	749.17	694.33	1.34	1.24
Maximum Value	3.5	3.0	52.0	51.0	908.0	863.0	1.75	1.50
Minimum Value	2.5	2.0	44.0	45.0	454.0	545.0	1.00	1.00
Variance	0.04	0.04	2.55	3.29	11,841.97	7,607.97	0.05	0.04
Std.Dev	0.21	0.20	1.60	1.81	108.82	87.22	0.22	0.20
Joint Variance	*****	0.04	*****	2.92	*****	9,724.97	*****	0.04
Jt Deg of Freedom	*****	46	*****	46	*****	46	*****	46.00
t-Test Parameter	*****	0.700	*****	1.182	*****	1.926	*****	1.71
Level of Significance	*****	.4877	*****	.2432	*****	.0603	*****	.0931
Confidence Level %	*****	51.227	*****	75.680	*****	93.972	*****	90.69
	1-5	1-5	Cm's	Cm's	Grams	Grams	Inches	Inches
MEASUREMENTS FOR SAMPLES	3.0	3.0	48.0	50.5	590	681	1.25	1.50
	3.0	3.0	47.0	51.0	681	863	1.25	1.25
	3.0	3.0	50.0	49.0	863	772	1.50	1.00
	3.0	3.0	47.0	45.0	636	545	1.25	1.00
Solidity measured on a scale of 1 to 5	2.5	3.0	44.0	48.0	454	726	1.00	1.25
	3.0	3.0	48.0	49.0	863	681	1.50	1.00
	3.5	3.0	49.0	49.0	863	636	1.50	1.00
	3.0	3.0	48.0	48.0	863	681	1.25	1.25
Note: The Level of Significance is determined by using Excel 5's 2-tail type 2 built in T-test function directly over the ranges of data.	3.0	3.0	48.0	50.0	681	817	1.00	1.50
	3.0	3.0	49.0	51.0	817	772	1.50	1.25
	3.0	3.0	52.0	50.0	681	772	1.00	1.25
	3.0	3.0	48.0	48.0	681	726	1.25	1.50
	3.0	3.0	48.0	46.0	726	545	1.25	1.00
	3.0	3.0	47.0	51.0	726	772	1.00	1.50
	2.5	3.0	45.5	49.0	772	681	1.00	1.50
	3.0	3.0	48.0	49.0	726	636	1.50	1.00
	3.0	3.0	50.0	46.0	817	590	1.50	1.50
	3.0	3.0	48.0	48.0	908	636	1.50	1.25
	3.0	2.0	47.0	45.0	636	545	1.50	1.00
	3.0	3.0	48.0	50.0	772	772	1.50	1.50
	3.5	3.0	49.0	49.0	908	681	1.75	1.00
	3.0	3.0	47.0	47.0	772	636	1.50	1.25
	3.0	3.0	47.0	47.0	772	772	1.50	1.25
	3.0	3.0	46.0	47.0	772	726	1.50	1.25

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PARAGON SEED COMPANY

P.O. Box 1906 Salinas, Ca. 93902 831-753-2100

Grand Slam vs Home Run

Leonardini-Pozzi — **Harvest date: May 31, 2002**

	Grand Slam Solidity	Home Run Solidity	Grand Slam Circum	Home Run Circum	Grand Slam Weight	Home Run Weight	Grand Slam Core Ht	Home Run Core Ht
Count	24	24	24	24	24	24	24	24
Sum	74.0	77.5	1,104.0	1,095.5	17,345.0	17,028.0	34.50	39.25
Mean	3.08	3.23	46.00	45.65	722.71	709.50	1.44	1.64
Maximum Value	4.0	4.0	49.0	48.0	953.0	863.0	2.00	2.00
Minimum Value	3.0	3.0	42.0	41.0	454.0	545.0	1.00	1.00
Variance	0.06	0.17	4.46	3.71	17,908.22	10,178.52	0.10	0.07
Std.Dev	0.24	0.42	2.11	1.93	133.82	100.89	0.32	0.27
Joint Variance	*****	0.12	*****	4.08	*****	14,043.37	*****	0.09
Jt Deg of Freedom	*****	46	*****	46	*****	46	*****	46.00
t-Test Parameter	*****	1.485	*****	0.607	*****	0.386	*****	2.32
Level of Significance	*****	.1443	*****	.5466	*****	.7012	*****	.0250
Confidence Level %	*****	85.566	*****	45.336	*****	29.880	*****	97.50
	1-5	1-5	Cm's	Cm's	Grams	Grams	Inches	Inches
MEASUREMENTS FOR SAMPLES	3.0	4.0	48.5	46.0	863	863	1.75	1.75
	3.0	3.0	46.0	48.0	681	817	1.25	1.75
	3.0	4.0	48.0	46.0	772	817	1.50	1.75
	3.0	3.0	47.0	48.0	681	726	1.00	1.50
Solidity measured on a scale of 1 to 5	3.0	3.0	44.0	45.0	772	728	1.50	1.75
	3.0	3.0	46.0	48.0	817	817	1.50	1.50
	3.0	3.0	46.0	48.0	726	636	1.50	1.50
	3.0	4.0	48.0	46.0	863	726	1.00	2.00
Note: The Level of Significance is determined by using Excel 5's 2-tail type 2 built in T-test function directly over the ranges of data.	3.0	3.0	43.0	45.0	636	545	1.25	1.00
	4.0	3.0	45.0	46.0	863	636	1.75	1.75
	3.0	3.0	42.0	48.0	545	681	1.25	1.75
	3.0	3.0	45.0	41.0	726	636	1.50	2.00
	3.0	3.0	47.0	47.5	817	681	2.00	1.75
	3.0	3.0	43.0	44.0	454	545	1.25	1.00
	3.5	3.5	47.5	44.0	953	772	1.75	1.75
	3.0	4.0	49.0	44.0	636	863	1.25	2.00
	3.0	3.0	48.0	46.0	681	545	1.25	1.50
	3.0	3.0	46.0	47.0	545	636	1.25	1.50
	3.0	3.0	45.0	44.0	908	681	2.00	1.50
	3.5	3.0	45.0	44.0	772	726	1.75	1.50
	3.0	4.0	49.0	44.0	636	726	1.25	2.00
	3.0	3.0	48.0	48.0	863	863	2.00	1.75
	3.0	3.0	46.0	43.0	636	772	1.00	1.50
	3.0	3.0	42.0	45.0	499	590	1.00	1.50

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letstat

PARAGON SEED COMPANY

P.O. Box 1906 Salinas, Ca. 93902 831-753-2100

Silverado vs Home Run

Leonardini-Pozzi — **Harvest date: May 31, 2002**

	Silverado	Home Run	Silverado	Home Run	Silverado	Home Run	Silverado	Home Run
	Solidity	Solidity	Circum	Circum	Weight	Weight	Core Ht	Core Ht
Count	24	24	24	24	24	24	24	24
Sum	76.0	77.5	1,083.0	1,095.5	16,889.0	17,028.0	32.00	39.25
Mean	3.17	3.23	45.13	45.65	703.71	709.50	1.33	1.64
Maximum Value	4.0	4.0	48.0	48.0	999.0	863.0	1.75	2.00
Minimum Value	2.0	3.0	41.0	41.0	454.0	545.0	1.00	1.00
Variance	0.28	0.17	2.66	3.71	24,726.48	10,178.52	0.06	0.07
Std.Dev	0.52	0.42	1.63	1.93	157.25	100.89	0.24	0.27
Joint Variance	*****	0.22	*****	3.18	*****	17,452.50	*****	0.06
Jt Deg of Freedom	*****	46	*****	46	*****	46	*****	46.00
t-Test Parameter	*****	0.457	*****	1.011	*****	0.152	*****	4.13
Level of Significance	*****	.6498	*****	.3171	*****	.8800	*****	.0002
Confidence Level %	*****	35.020	*****	68.291	*****	12.004	*****	99.98
	1-5	1-5	Cm's	Cm's	Grams	Grams	Inches	Inches
MEASUREMENTS FOR SAMPLES	3.0	4.0	48.0	46.0	772	863	1.50	1.75
	4.0	3.0	46.0	48.0	908	817	1.50	1.75
	3.0	4.0	46.0	46.0	772	817	1.50	1.75
	2.0	3.0	41.0	48.0	454	726	1.00	1.50
Solidity measured on a scale of 1 to 5	3.0	3.0	43.0	45.0	545	728	1.00	1.75
	4.0	3.0	46.0	48.0	817	817	1.50	1.50
	3.0	3.0	45.0	48.0	545	636	1.00	1.50
	4.0	4.0	46.5	46.0	908	726	1.75	2.00
Note: The Level of Significance is determined by using Excel 5's 2-tail type 2 built in T-test function directly over the ranges of data.	3.0	3.0	44.0	45.0	726	545	1.25	1.00
	3.0	3.0	45.0	46.0	545	636	1.50	1.75
	3.5	3.0	43.0	48.0	726	681	1.50	1.75
	3.0	3.0	44.0	41.0	545	636	1.25	2.00
	3.0	3.0	45.0	47.5	726	681	1.50	1.75
	3.0	3.0	43.0	44.0	545	545	1.25	1.00
	2.0	3.5	46.0	44.0	454	772	1.00	1.75
	3.0	4.0	43.5	44.0	590	863	1.00	2.00
	4.0	3.0	46.0	46.0	772	545	1.75	1.50
	3.0	3.0	47.0	47.0	726	636	1.25	1.50
	3.0	3.0	46.0	44.0	863	681	1.25	1.50
	3.5	3.0	46.0	44.0	908	726	1.50	1.50
	3.5	4.0	47.0	44.0	999	726	1.50	2.00
	3.0	3.0	46.0	48.0	681	863	1.25	1.75
	3.0	3.0	44.0	43.0	545	772	1.00	1.50
	3.5	3.0	46.0	45.0	817	590	1.50	1.50

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PARAGON SEED COMPANY

P.O. Box 1906 Salinas, Ca. 93902 831-753-2100

Home Run vs Hallmark W

Rava Ranches-Gallagher **Harvest date: May 16, 2002**

	Home Run Solidity	Hallmark W Solidity	Home Run Circum	Hallmark W Circum	Home Run Weight	Hallmark W Weight	Home Run Core Ht	Hallmark W Core Ht
Count	24	24	24	24	24	24	24	24
Sum	78.0	72.5	1,182.0	1,174.0	21,203.0	19,794.0	37.18	33.00
Mean	3.25	3.02	49.25	48.92	883.46	824.75	1.55	1.38
Maximum Value	4.0	4.0	54.0	52.0	1,226.0	1,044.0	2.00	2.00
Minimum Value	2.5	2.5	41.0	44.0	545.0	590.0	0.18	1.00
Variance	0.20	0.08	7.22	4.54	14,514.26	19,832.89	0.17	0.11
Std.Dev	0.44	0.28	2.69	2.13	120.48	140.83	0.41	0.33
Joint Variance	*****	0.14	*****	5.88	*****	17,173.58	*****	0.14
Jt Deg of Freedom	*****	46	*****	46	*****	46	*****	46.00
t-Test Parameter	*****	2.155	*****	0.476	*****	1.552	*****	1.63
Level of Significance	*****	.0364	*****	.6361	*****	.1275	*****	.1109
Confidence Level %	*****	96.361	*****	36.390	*****	87.246	*****	88.91
	1-5	1-5	Cm's	Cm's	Grams	Grams	Inches	Inches
MEASUREMENTS FOR SAMPLES	3.0	3.0	46.0	49.0	863	908	1.50	1.50
	3.5	3.0	50.0	51.0	1,044	999	1.50	1.50
	3.0	3.0	46.0	49.0	817	908	1.50	1.50
	4.0	3.0	51.0	50.0	908	863	2.00	1.50
Solidity measured on a scale of 1 to 5	3.0	3.0	51.0	46.5	908	681	2.00	1.00
	3.0	3.0	51.0	49.0	817	772	1.75	1.25
	3.0	3.0	47.0	44.0	772	636	1.25	1.00
	3.0	3.0	49.5	52.0	908	817	2.00	1.25
Note: The Level of Significance is determined by using Excel 5's 2-tail type 2 built in T-test function directly over the ranges of data.	3.0	3.0	51.0	47.0	863	726	1.50	1.00
	3.0	2.5	49.0	47.0	863	590	1.50	1.00
	3.5	3.5	49.5	52.0	908	908	1.50	1.00
	3.0	3.0	50.0	48.0	817	636	1.75	1.50
	3.0	3.0	49.0	49.0	953	908	1.75	2.00
	3.5	3.0	50.0	49.0	908	817	1.75	1.00
	3.0	4.0	52.0	51.0	817	1,044	1.00	2.00
	4.0	3.0	54.0	49.0	1,226	817	2.00	1.50
	3.0	3.0	46.0	49.0	817	908	1.50	1.00
	3.0	3.0	52.0	51.5	908	953	0.18	1.50
	4.0	3.0	50.0	50.0	999	908	1.75	1.50
	3.0	2.5	47.0	47.0	817	590	1.50	1.00
	3.0	3.0	50.0	52.0	863	953	1.50	1.50
	2.5	3.0	41.0	49.0	545	999	1.00	1.50
	4.0	3.0	51.0	45.0	999	590	2.00	1.50
	4.0	3.0	49.0	48.0	863	863	1.50	2.00

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PARAGON SEED COMPANY

P.O. Box 1906 Salinas, Ca. 93902 831-753-2100

Home Run vs Cannery Row

Akita Ranch-Gonzales — **Harvest date: May 22, 2002**

	Home Run Solidity	Cannery Row Solidity	Home Run Circum	Cannery Row Circum	Home Run Weight	Cannery Row Weight	Home Run Core Ht	Cannery Row Core Ht
Count	24	24	24	24	24	24	24	24
Sum	71.5	70.5	1,120.5	1,123.0	16,887.0	17,115.0	31.50	30.45
Mean	2.98	2.94	46.69	46.79	703.63	713.13	1.31	1.27
Maximum Value	3.5	3.0	52.0	49.0	953.0	817.0	2.00	1.50
Minimum Value	2.0	2.0	42.0	42.0	454.0	499.0	1.00	1.00
Variance	0.05	0.05	5.21	3.89	11,828.16	8,508.90	0.08	0.05
Std.Dev	0.23	0.22	2.28	1.97	108.76	92.24	0.29	0.22
Joint Variance	*****	0.05	*****	4.55	*****	10,168.53	*****	0.07
Jt Deg of Freedom	*****	46	*****	46	*****	46	*****	46.00
t-Test Parameter	*****	0.632	*****	0.169	*****	0.326	*****	0.59
Level of Significance	*****	.5302	*****	.8664	*****	.7456	*****	.5574
Confidence Level %	*****	46.978	*****	13.357	*****	25.436	*****	44.26
	1-5	1-5	Cm's	Cm's	Grams	Grams	Inches	Inches
MEASUREMENTS FOR SAMPLES	3.0	3.0	49.0	47.5	590	817	1.25	1.50
	3.0	3.0	45.0	46.0	590	590	1.00	1.50
	3.0	3.0	49.0	43.5	726	681	1.25	1.50
	3.0	3.0	46.0	46.5	681	772	1.75	1.00
Solidity measured on a scale of 1 to 5	2.0	3.0	44.0	48.0	454	772	1.00	1.50
	3.0	3.0	49.0	47.5	681	817	1.50	1.00
	3.5	3.0	48.0	48.0	953	726	1.75	1.25
	3.0	3.0	48.0	44.5	772	681	1.50	1.50
Note: The Level of Significance is determined by using Excel 5's 2-tail type 2 built in T-test function directly over the ranges of data.	3.0	3.0	44.0	46.5	636	545	1.50	1.20
	3.0	3.0	46.0	49.0	726	817	1.25	1.25
	3.0	3.0	45.5	48.0	681	772	1.00	1.50
	3.0	3.0	47.0	48.0	681	681	1.25	1.25
	3.0	3.0	46.0	43.0	726	636	1.50	1.50
	3.0	3.0	48.0	49.0	863	772	2.00	1.50
	3.0	3.0	52.0	48.0	726	636	1.50	1.00
	3.0	3.0	46.0	48.0	726	772	1.50	1.25
	3.0	3.0	42.0	48.0	590	726	1.00	1.00
	3.0	3.0	44.0	49.0	545	817	1.00	1.50
	3.0	3.0	47.0	42.0	817	499	1.25	1.00
	3.0	3.0	48.0	46.0	681	681	1.00	1.00
	3.0	3.0	44.0	49.0	772	772	1.00	1.50
	3.0	2.0	50.0	46.0	863	590	1.50	1.00
	3.0	2.5	46.0	45.0	681	817	1.25	1.25
	3.0	3.0	47.0	47.0	726	726	1.00	1.00

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PARAGON SEED COMPANY

P.O. Box 1906 Salinas, Ca. 93902 831-753-2100

Silverado vs Home Run

Bassetti-Greenfield **Harvest date: May 16, 2002**

	Silverado	Home Run	Silverado	Home Run	Silverado	Home Run	Silverado	Home Run
	Solidity	Solidity	Circum	Circum	Weight	Weight	Core Ht	Core Ht
Count	24	24	24	24	24	24	24	24
Sum	73.0	81.5	1,116.5	1,071.5	16,756.0	16,344.0	29.25	28.25
Mean	3.04	3.40	46.52	44.65	698.17	681.00	1.22	1.18
Maximum Value	3.5	4.0	51.0	48.0	863.0	908.0	1.75	1.75
Minimum Value	2.0	3.0	41.0	41.0	499.0	499.0	1.00	1.00
Variance	0.09	0.22	7.90	4.60	14,322.84	11,665.91	0.06	0.06
Std.Dev	0.29	0.47	2.81	2.14	119.68	108.01	0.25	0.24
Joint Variance	*****	0.15	*****	6.25	*****	12,994.38	*****	0.06
Jt Deg of Freedom	*****	46	*****	46	*****	46	*****	46.00
t-Test Parameter	*****	3.157	*****	2.598	*****	0.522	*****	0.59
Level of Significance	*****	.0028	*****	.0125	*****	.6044	*****	.5560
Confidence Level %	*****	99.719	*****	98.745	*****	39.560	*****	44.40
	1-5	1-5	Cm's	Cm's	Grams	Grams	Inches	Inches
MEASUREMENTS FOR SAMPLES	3.0	3.0	49.0	43.0	681	636	1.25	1.00
	3.0	3.0	47.0	43.0	726	636	1.00	1.00
	3.0	3.0	44.0	43.0	636	636	1.25	1.00
	3.0	3.0	44.5	41.0	681	499	1.00	1.00
Solidity measured on a scale of 1 to 5	3.5	4.0	47.0	46.5	817	817	1.00	1.50
	3.0	3.0	50.0	46.0	863	590	1.50	1.00
	3.5	3.5	50.0	46.0	863	726	1.75	1.00
	3.0	3.0	46.0	46.0	636	590	1.00	1.00
Note: The Level of Significance is determined by using Excel 5's 2-tail type 2 built in T-test function directly over the ranges of data.	3.0	4.0	44.0	46.5	545	772	1.00	1.25
	3.0	4.0	48.0	46.0	817	772	1.25	1.25
	3.5	3.5	44.5	45.0	681	726	1.50	1.00
	3.0	4.0	43.0	47.0	545	772	1.50	1.00
	3.5	4.0	48.5	48.0	863	908	1.75	1.50
	3.0	4.0	49.0	47.5	863	772	1.50	1.50
	2.0	3.0	48.0	44.0	499	681	1.00	1.25
	3.0	3.0	43.0	41.0	545	499	1.00	1.00
	3.0	4.0	45.5	47.0	636	772	1.25	1.50
	3.0	3.0	45.0	44.0	636	681	1.00	1.00
	3.0	3.0	51.0	45.0	772	590	1.00	1.25
	3.0	4.0	49.0	42.0	772	636	1.25	1.00
	3.0	3.0	42.0	41.0	636	499	1.00	1.00
	3.0	3.0	41.0	44.0	499	681	1.00	1.75
	3.0	3.0	49.0	46.0	772	817	1.25	1.50
	3.0	3.5	48.5	43.0	772	636	1.25	1.00

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PARAGON SEED COMPANY

P.O. Box 1906 Salinas, Ca. 93902 831-753-2100

Sharpshooter vs Home Run

Bassetti-Greenfield **Harvest date: May 16, 2002**

	Sharp shooter	Home Run	Sharp shooter	Home Run	Sharp shooter	Home Run	Sharp shooter	Home Run
	Solidity	Solidity	Circum	Circum	Weight	Weight	Core Ht	Core Ht
Count	24	24	24	24	24	24	24	24
Sum	77.0	81.5	1,176.0	1,071.5	17,613.0	16,344.0	33.50	28.25
Mean	3.21	3.40	49.00	44.65	733.88	681.00	1.40	1.18
Maximum Value	4.0	4.0	53.0	48.0	953.0	908.0	2.25	1.75
Minimum Value	2.0	3.0	45.0	41.0	545.0	499.0	1.00	1.00
Variance	0.24	0.22	6.43	4.60	13,561.77	11,665.91	0.14	0.06
Std.Dev	0.49	0.47	2.54	2.14	116.45	108.01	0.37	0.24
Joint Variance	*****	0.23	*****	5.52	*****	12,613.84	*****	0.10
Jt Deg of Freedom	*****	46	*****	46	*****	46	*****	46.00
t-Test Parameter	*****	1.363	*****	6.422	*****	1.631	*****	2.44
Level of Significance	*****	.1796	*****	.0000	*****	.1097	*****	.0184
Confidence Level %	*****	82.044	*****	100.000	*****	89.025	*****	98.16
	1-5	1-5	Cm's	Cm's	Grams	Grams	Inches	Inches
MEASUREMENTS FOR SAMPLES	3.0	3.0	51.0	43.0	726	636	1.00	1.00
	3.0	3.0	50.0	43.0	772	636	1.75	1.00
	4.0	3.0	52.0	43.0	908	636	2.00	1.00
	3.0	3.0	52.0	41.0	681	499	1.00	1.00
Solidity measured on a scale of 1 to 5	3.0	4.0	47.0	46.5	726	817	1.00	1.50
	2.0	3.0	49.0	46.0	545	590	1.00	1.00
	4.0	3.5	52.0	46.0	863	726	2.25	1.00
	3.0	3.0	51.0	46.0	726	590	1.00	1.00
Note: The Level of Significance is determined by using Excel 5's 2-tail type 2 built in T-test function directly over the ranges of data.	3.5	4.0	53.0	46.5	953	772	1.25	1.25
	3.0	4.0	47.0	46.0	590	772	1.50	1.25
	3.0	3.5	49.0	45.0	726	726	1.50	1.00
	3.0	4.0	46.0	47.0	726	772	1.50	1.00
	3.0	4.0	46.0	48.0	681	908	1.50	1.50
	3.0	4.0	46.0	47.5	590	772	1.00	1.50
	3.0	3.0	49.0	44.0	772	681	1.50	1.25
	3.0	3.0	46.0	41.0	590	499	1.25	1.00
	4.0	4.0	52.0	47.0	908	772	1.75	1.50
	3.0	3.0	46.0	44.0	545	681	1.00	1.00
	3.0	3.0	48.0	45.0	681	590	1.50	1.25
	3.0	4.0	52.0	42.0	681	636	1.00	1.00
	3.5	3.0	47.0	41.0	817	499	2.00	1.00
	3.0	3.0	51.0	44.0	772	681	1.50	1.75
	4.0	3.0	49.0	46.0	908	817	1.50	1.50
	4.0	3.5	45.0	43.0	726	636	1.25	1.00

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AGRICULTURAL MARKETING SERVICE

EXHIBIT E
STATEMENT OF THE BASIS OF OWNERSHIP

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S)	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER	3. VARIETY NAME
Paragon Seed, Inc.	Exp. 1511	Home Run

4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP, and Country)*	5. TELEPHONE *(include area code)*	6. FAX *(include area code)*
507 Abbott Street P.O. Box 1906 93902 Salinas, California	831-753-2100	831-753-1470

7. PVPO NUMBER 20030214

8. Does the applicant own all rights to the variety? *Mark an "X" in appropriate block.* If no, please explain. [X] YES [ ] NO

9. Is the applicant (individual or company) a U.S. national or U.S. based company? [X] YES [ ] NO
If no, give name of country

10. Is the applicant the original owner? [X] YES [ ] NO *If no, please answer one of the following:*

a. If original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. national(s)?

[ ] YES [ ] NO If no, give name of country

b. If original rights to variety were owned by a company(ies), is(are) the original owner(s) a U.S. based company?

[ ] YES [ ] NO If no, give name of country

11. Additional explanation on ownership *(if needed, use reverse for extra space)*:

PLEASE NOTE:

Plant variety protection can be afforded only to owners (not licensees) who meet one of the following criteria:

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.

2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.

3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definition.